perforated tube, filters through the substance to be extracted, and passes back into the flask. After the operation has continued as long as is desired, the perforated tube is removed, the apparatus inclined so as to carry the condensed liquid out instead of back, and the solvent distilled off. The solvent may thus be recovered, which is an item of no small importance where ether is used and many determinations are to be made. The flask with the substance extracted is then carefully dried and weighed.

The chief advantages of this extractor are, its simplicity and consequent convenience of handling, and its freedom from corks which come in contact with the solvent. It avoids the slender tubes and multiplicity of connections so common in extractors, and at the same time can be manufactured at a very moderate cost. Every chemist knows the difficulty and inconvenience of completely removing the soluble substances from corks, but if it is desired the flask can be made without having the neck ground, and it can be connected by a cork to an inverted Liebig's condenser. In this form the extractor is still cheaper, and, even with the one cork, is more desirable than any other form that has come under our notice.

This apparatus was designed for quantitative work, but with some modifications it might be adapted to pharmaceutical operations. The flask would have to be made deeper and the neck much wider, to admit a large perforated tube. The flask could be connected with the condenser by means of a broad ring of glass, ground on its outer edge to fit the neck of the flask, and within to fit the condenser tube. In that way an apparatus of considerable capacity could be constructed, and we think at less cost than those now in use.

REPORT ON GEOLOGY.

BY ROBERT HAY,

One of the members of the Geological Commission of the Academy.

The writer does not know of any geological work accomplished in the State during the past year, which is available for this report to the Academy, except that done by himself, most of which will be given in papers on definite subjects. There is one point, however, to which he must definitely refer here, viz., the easterly extension of the Tertiary formations in southern Kansas. In the northern part of the State the eastern limit has been marked by Prof. Mudge and Prof. St. John, with some approach to accuracy, notwithstanding the difficulty of distinguishing them in that region from the yellow marl or other quarternary deposit. In the southern part, however, no map of the State has yet recognized the existence of Tertiary deposits south of the Arkansas river, or as immediately resting on paleozoic formations. The writer has found this year, however, that the formation which in his report on Norton county he called the Equüs Beds (Cope), is the deposit forming the high prairie in the counties of Hamilton, Finney, Seward, Ford, Edwards, Pratt, Comanche, Barber, Kingman, and Sedgwick. In the latter county he found it east of the sixth principal meridian, east of the Arkansas river, a few miles out of Wichita, and there it was in contact with the Permian strata of the region.

In many places this formation, which in our note-books we uniformly designate as tertiary marl, lies over the same deposit which in the northwest we have called the Loup Fork. It contains the same fossils, mammalian bones, and turtle; and has the same variety of structure, from a mortar-like grit to a heavy conglomerate. In several places, however, it was manifest that the mortar-like grit is the upper part of the deposit, the conglomerate being below. We found the conglomerate beneath the

tertiary marl in places very wide apart; *e. g.*, west of Garden City, on the Cimarron river, in Meade county, in Comanche and Barber; and we are inclined to think an isolated patch near Wellington, in Sumner county, also belongs to it. This being so, the future maps must recognize the tertiary formations in the south as far east as the sixth principal meridian. As we show elsewhere, this fact is of economic value as bearing on the water supply of the west. In one place the tertiary grit yielded abundance of a pretty fossil univalve.

In the wild region stretching west from Medicine Lodge into Comanche county another problem has to be worked out, viz., whether the red rock and the gypsum belong to Cretaceous or older formations, Triassic or Permian. The beautifully variegated sandstones referred to by Professor Cragin in a printed notice of a run through Barber county I am inclined to consider as undoubtedly Dacotah, but in the only place where I got at their base they seemed to rest on the eroded surface of the Red Rock. On the other hand, in the west part of Sumner county we found a red clay intercalated with the well-known Permian strata. This clay was so like the clay of the Red Rock series that it seems to be a premonition of it. The line of contact of the undoubted Permian and the Red Rock series runs through Harper and Kingman counties. That line calls for investigation.

There are many matters of interest that will be dwelt upon by investigators of the southwest: caves in the gypsum, the habits and habitats of animals, great fossil remains; but one of the greatest wonders to be made known will be the story of EROSION, which a geologist able to read his record will have to transcribe and illustrate so that others may understand how hills and mountains are carved out of the dead level of the prairies, and how the hardest rocks marked by the stylus of the ages are read like rolls of ancient seers.

ON THE OCCURRENCE OF BROMIDES AND IODIDES IN THE WATER OF AN ARTESIAN WELL AT INDEPENDENCE, KAS.

BY PROF. E. H. S. BAILEY, LAWRENCE, KAS.

Some time since, in boring for coal, a well 1,091 feet in depth was sunk at Independence, Kas. The well proved to be of value in furnishing a strong mineral water. This brine has a specific gravity of 1.052, and issues at a temperature of 62° F. The well is piped for 400 feet, and the water is pumped from a depth of about 300 feet.

On analysis the water was shown to contain the following constituents, expressed in grammes per liter:

Constituents.	*Grammes.*	*Constituents.*	*Grammes.*
Silica ($S.O_2$)	0.0198	Bromine (Br)	0.1826
Iron Peroxide (Fe_2O_3)	0.0106	Iodine (I)	0.0013
Alumina (Al_2O_3)	a trace.	Carbon Dioxide (CO_2)	0.2679
Calcium Oxide (CaO)	3.8710	Organic matter	a trace.
Magnesium Oxide (MgO)	2.5400		
Potassium Oxide (K_2O)	0.1277	Total	83.4071
Sulphuric Oxide (SO_3)	0.1997	Less Oxygen equivalent Cl. Br. I	10.1967
Sodium Oxide (Na_2O)	31.0563		
Chlorine (Cl)	45.1302		73.2104